What is claimed is:

1.   A ruled line extracting apparatus,
comprising:

5   estimating means for estimating a size of a
standard pattern included in an input image; and
straight line extracting means for setting a
threshold value based on information of the size of
the standard pattern, and extracting information of
10   one or more straight line patterns from the input
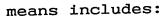image using the threshold value.

2.   The ruled line extracting apparatus according
to claim 1, wherein said estimating means estimates
15   a size of a character pattern included in the input
image as the size of the standard pattern.

3.   The ruled line extracting apparatus according
to claim 1, wherein said estimating means estimates
20   the size of the standard pattern based on a histogram
of sizes of pixel concatenation regions included in
the input image.

4.   The ruled line extracting apparatus according
25   to claim 1, wherein said straight line extracting

means includes:

straight line deleting means for determining whether or not to delete one of the one or more straight line patterns, by using the threshold value and at least either of information about a shape of one among one or more straight line patterns, and information about a distance between two straight line patterns included in one or more straight line patterns.

5. The ruled line extracting apparatus according to claim 1, wherein said straight line extracting means includes:

straight line deleting means for determining whether or not to delete either of a horizontal straight line pattern and a vertical straight line pattern included in the one or more straight line patterns, based on a link relationship between the horizontal straight line pattern and the vertical straight line pattern and the threshold value.

6. The ruled line extracting apparatus according to claim 1, wherein said straight line extracting means includes:

straight line deleting means for determining

whether or not to delete a shorter pattern of two straight line patterns which are included in the one or more straight line patterns and almost overlap, using the threshold value.

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7.   A   ruled   line   extracting   apparatus, comprising:

straight line extracting means for extracting information of one or more straight line patterns from

10   an input image;

calculating means for obtaining a representative value of sizes of the one or more straight line patterns; and

15   straight line processing means for setting a threshold value based on the representative value, and .processing the information of the one or more straight line patterns using the threshold value.

20   8. The ruled line extracting apparatus according to claim 7, wherein said calculating means obtains the representative value according to either of a histogram of heights of horizontal straight line patterns included in the one or more straight line

25   patterns, and a histogram of widths of vertical

straight line patterns included in the one or more straight line patterns.

9. The ruled line extracting apparatus according to claim 7, wherein said straight line processing means further comprises a straight line integrating means for recognizing a straight line pattern after integration as a ruled line candidate, if a size of the straight line pattern generated by integrating two straight line patterns which partially overlap among the one or more straight line patterns, is approximately the representative value.

10. A ruled line extracting apparatus, comprising:

straight line extracting means for extracting information of one or more straight line patterns from an input image;

calculating means for obtaining a representative value of sizes of one or more segment patterns structuring the one or more straight line patterns; and

straight line processing means for setting a threshold value based on the representative value, and processing the information of the one or more straight

line patterns using the threshold value.

11. The ruled line extracting apparatus according to claim 10, wherein said calculating means obtains

5 the representative value according to either of a histogram of heights of horizontal segment patterns included in the one or more segment patterns, and a histogram of widths of vertical segment patterns included in the one or more straight line patterns.

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12. The ruled line extracting apparatus according to claim 10, wherein said straight line processing means further comprises:

straight line deleting means for deleting a

15 straight line pattern composed of segment patterns which are larger than the threshold value among the one or more straight line patterns.

13. A ruled line extracting apparatus,

20 comprising:

segment extracting means for extracting information of one or more segment patterns from an input image;

storing means for classifying the information of

25 the one or more segment patterns into information of

a large segment pattern and information of a small segment pattern; and

straight line extracting means for examining a link state of the one or more segment patterns, and when a large segment pattern is linked to small segment patterns, extracting a straight line pattern composed of the small segment patterns regardless of a size of the large segment pattern.

14. A ruled line extracting apparatus, comprising:

straight line extracting means for extracting information of one or more straight line patterns from an input image; and

straight line integrating means for integrating two straight line patterns included in the one or more straight line patterns if the two straight line patterns almost overlap .

15. A ruled line extracting apparatus, comprising:

straight line extracting means for extracting information of one or more straight line patterns from an input image; and

straight line deleting means for determining

whether or not to delete one among the one or more straight line patterns by using at least one of information about a shape of the one among the one or more straight line patterns, and information about a

5   distance between two straight line patterns included in the one or more straight line patterns.

16.   A ruled line extracting apparatus, comprising:

10   straight line extracting means for extracting information of one or more straight line patterns from an input image; and

straight line deleting means for determining whether or not to delete either of a horizontal

15   straight line pattern and a vertical straight line pattern included in the one or more straight line patterns, based on a link relationship between the horizontal straight line pattern and the vertical straight line pattern.

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17.   A ruled line extracting apparatus, comprising:

straight line extracting means for extracting information of one or more straight line patterns from

25   an input image; and

straight line deleting means for deleting a shorter pattern of two straight line patterns which are included in the one or more straight line patterns and almost overlap.

18. A ruled line extracting apparatus, comprising:

straight line extracting means for extracting information of one or more straight line patterns from an input image; and

straight line integrating means for recognizing a straight line pattern after integration as a ruled line candidate, if a size of the straight line pattern generated by integrating two straight line patterns which partially overlap among the one or more straight line patterns, is approximately a predetermined value.

19. A ruled line extracting apparatus, comprising:

straight line extracting means for extracting information of one or more straight line patterns from an input image; and

straight line deleting means for deleting a straight line pattern composed of segment patterns which are larger than a threshold value, among the one

or more straight line patterns.

20.   A   ruled   line   extracting   apparatus,
comprising:

5   straight   line   extracting   means   for   extracting
information of a straight line pattern from an input
image;

graph generating means for obtaining the number of
pixels included in a segment pattern of a standard

10   size among one or more segment patterns structuring
the straight line pattern, and generating a graph
representing the number of pixels around the straight
line pattern; and

straight line deleting means for determining

15   whether or not to delete the straight line pattern
based on a shape of the graph.

21. The ruled line extracting apparatus according
to claim 20, further comprising:

20   storing means for attaching a mark to information
of a large segment pattern among the one or more
segment patterns, and storing information of the one
or more segment patterns, wherein said graph
generating means recognizes a segment pattern to which

25   the mark is not attached among the one or more segment

patterns as the segment pattern of the standard size.

22. The ruled line extracting apparatus according to claim 20, wherein:

5   said graph generating means shifts the segment pattern of the standard size in a direction perpendicular to a direction of a length of the straight line pattern, and generates the graph representing a relationship between an amount of shift

10   and the number of pixels; and

said straight line deleting means deletes the straight line pattern if the shape of the graph is gentle.
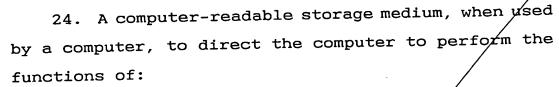
15   23. A computer-readable storage medium, when used by a computer, to direct the computer to perform the functions of:

estimating a size of a standard pattern included in an input image;

20   setting a threshold value based on information of the size of the standard pattern; and

extracting information of one or more straight line patterns from the input image using the threshold value.

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24. A computer-readable storage medium, when used by a computer, to direct the computer to perform the functions of:

extracting information of one or more straight line patterns from an input image;

obtaining a representative value of sizes of the one or more straight line patterns;

setting a threshold value based on the representative value; and

processing the information of the one or more straight line patterns using the threshold value.

25. A computer-readable storage medium, when used by a computer, to direct the computer to perform the functions of:

extracting information of one or more straight line patterns from an input image;

obtaining a representative value of sizes of one or more segment patterns structuring the one or more straight line patterns;

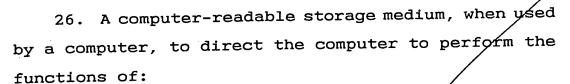setting a threshold value based on the representative value; and

processing the information of the one or more straight line patterns using the threshold value.

26. A computer-readable storage medium, when used by a computer, to direct the computer to perform the functions of:

extracting information of one or more segment patterns from an input image;

classifying the information of the one or more segment patterns into information of a large segment pattern and information of a small segment pattern; and

examining a link state of one or more segment patterns, and when a large segment pattern is linked to small segment patterns, extracting a straight line pattern composed of the small segment patterns regardless of a size of the large segment pattern.

27. A computer-readable storage medium, when used by a computer, to direct the computer to perform the functions of:

extracting information of one or more straight line patterns from an input image; and

integrating two straight line patterns included in the one or more straight line patterns into one, if the two straight line patterns almost overlap.

28. A computer-readable storage medium, when used

by a computer, to direct the computer to perform the functions of:

extracting information of one or more straight line patterns from an input image; and

5   determining whether or not to delete one among the one or more straight line patterns, using at least either of information about a shape of the one among the one or more straight line patterns, and information about a distance between two straight line
10   patterns included in the one or more straight line patterns.

29.   A computer-readable storage medium, when used by a computer, to direct the computer to perform the
15   functions of:

extracting information of one or more straight line patterns from an input image; and

determining whether or not to delete either of a horizontal straight line pattern and a vertical
20   straight line pattern included in the one or more straight line patterns, based on a link relationship between the horizontal straight line pattern and the vertical straight line pattern.

25   30.   A computer-readable storage medium, when used

by a computer, to direct the computer to perform the functions of:

extracting information of one or more straight line patterns from an input image; and

5   deleting a shorter pattern of two straight line patterns which are included in the one or more straight line patterns and almost overlap.

31. A computer-readable storage medium, when used
10   by a computer, to direct the computer to perform the functions of:

extracting information of one or more straight line patterns from an input image; and

recognizing a straight line pattern after
15   integration as a ruled line candidate, if a size of the straight line pattern generated by integrating two straight line patterns which partially overlap among the one or more straight line patterns is approximately a predetermined value.

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32. A computer-readable storage medium, when used by a computer, to direct the computer to perform the functions of:
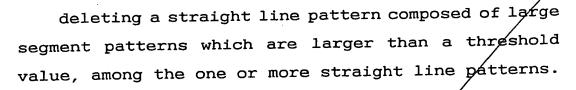
extracting information of one or more straight
25   line patterns from an input image; and

deleting a straight line pattern composed of large segment patterns which are larger than a threshold value, among the one or more straight line patterns.

5   33. A computer-readable storage medium, when used by a computer, to direct the computer to perform the functions of:

extracting information of a straight line pattern from an input image;

10   obtaining the number of pixels included in a segment pattern of a standard size among one or more segment patterns structuring the straight line pattern, and generating a graph representing the number of pixels around the straight line pattern; and

15   determining whether or not to delete the straight line pattern based on a shape of the graph.

34. A ruled line extracting method, comprising the steps of:

20   estimating a size of a standard pattern included in a input image;

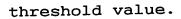setting a threshold value based on information of the size of the standard pattern; and

extracting information of one or more straight

25   line patterns from the input image, using the

threshold value.

35. A ruled line extracting method, comprising the steps of:

5   extracting information of one or more straight line patterns from an input image;

obtaining a representative value of sizes of the one or more straight line patterns;

setting a threshold value based on the representative value; and

10   processing the information of the one or more straight line patterns using the threshold value.

36. A ruled line extracting method, comprising

15   the steps of:

extracting information of one or more straight line patterns from an input image;

obtaining a representative value of sizes of one or more segment patterns structuring the one or more

20   straight line patterns;

setting a threshold value based on the representative value; and

processing the information of the one or more straight line patterns using the threshold value.

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37. A ruled line extracting method, comprising the steps of:

extracting information of one or more segment patterns from an input image;

5 classifying the information of the one or more segment patterns into information of a large segment pattern and information of a small segment pattern; and

examining a link state of one or more segment 10 patterns, and when a large segment pattern is linked to small segment patterns, extracting a straight line pattern composed of the small segment patterns regardless of a size of the large segment pattern.

15 38. A ruled line extracting method, comprising the steps of:

extracting information of one or more straight line patterns from an input image; and

integrating two straight line patterns included in 20 the one or more straight line patterns, if the two straight line patterns almost overlap.

39. A ruled line extracting method, comprising the steps of:

25 extracting information of one or more straight

line patterns from an input image; and

determining whether or not to delete one among the one or more straight line patterns, using at least either of information about a shape of the one among

5   the one or more straight line patterns, and information about a distance between two straight line patterns included in the one or more straight line patterns.

10 40. A ruled line extracting method, comprising the steps of:

extracting information of one or more straight line patterns from an input image; and

determining whether or not to delete either of a

15 horizontal straight line pattern and a vertical straight line pattern included in the one or more straight line patterns, based on a link relationship between the horizontal straight line pattern and the vertical straight line pattern.

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41. A ruled line extracting method, comprising the steps of:

extracting information of one or more straight line patterns from an input image;

25 deleting a shorter pattern of two straight line

patterns which are included in the one or more straight line patterns and almost overlap.

42. A ruled line extracting method, comprising the steps of:

extracting information of one or more straight line patterns from an input image;

recognizing a straight line pattern after integration as a ruled line candidate, if a size of the straight line pattern generated by integrating two straight line patterns which partially overlap among the one or more straight line patterns, is approximately a predetermined value.

43. A ruled line extracting method, comprising the steps of:

extracting information of one or more straight line patterns from an input image; and

deleting a straight line pattern composed of segment patterns which are larger than a threshold value, among the one or more straight line patterns.

44. A ruled line extracting method, comprising the steps of:

extracting information of a straight line pattern

from an input image;

obtaining the number of pixels included in a segment pattern of a standard size among one or more segment patterns structuring the straight line pattern, and generating a graph representing the number of pixels around the straight line pattern; and

determining whether or not to delete the straight line pattern based on a shape of the graph.